# Proceedings
of the Marine Safety Council

U.S. Department
of Transportation
**United States**
**Coast Guard**

**Vol. 39, No. 9** **Sept./Oct. 1982** **CG-129**

# Proceedings
of the Marine Safety Council

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DIST. (SDL No. 115)
A: acde(2); fghklmntuv(1)
B: n(50); c(16); e(5); f(4); gj(3); r(2); bkiq(1)
C: egimp(1)
D: adgklm(1)
E: mn(1)
F: abcdehjkloqst(1)
List TCG-06


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*A metal fire on a ship is difficult to put out. In many cases, the only solution is to unload the cargo, as was done with the metal turnings shown here, carried by the M/V BRUNLA. Preventing such fires is a better solution. For more on metal fires and what can be done to prevent them, see "Too Many Fires in the Iron," beginning on page 275.*

### MarAd Opens New Fire Training Center

The Maritime Administration formally opened its new Merchant Seaman Fire Training Center at Swanton, Ohio, on August 11, completing a master plan to provide Federal firefighter schools for merchant mariners in all of the coastal/regional areas served by the agency.

The training center, located near the Toledo Express Airport, was dedicated in a 30-minute ceremony, which was followed by a marine firefighting demonstration. It will serve the eight-state Great Lakes maritime community—America's "Fourth Seacoast"—and also provide training to men and women who sail on inland waterways vessels in contiguous areas to the south.

The new center is the fourth in this country offering hands-on firefighting instruction to merchant seamen. MarAd opened a training facility in New Orleans in November 1980 and, jointly with the U.S. Navy's Military Sealift Command, provides similar training at Earle, New Jersey, and Treasure Island in San Francisco Bay.

In remarks prepared for the dedication, Howard A. Watters, Deputy Maritime Administrator for Inland Waterways and Great Lakes, U.S. Department of Transportation, hailed the opening day as a significant one "in the U.S. maritime industry's historic endeavor to safeguard the lives of sailors." Emphasizing the importance which the government, ship operators, and maritime labor attach to fire prevention and firefighter training, Watters said:

"In no other environment other than perhaps a crowded theater does the cry of 'Fire!' cause such great fear as the sounding of that alarm aboard ship. At sea there is no fire department to call. A ship's crew is on its own, and each crew must be trained to fight its own fires."

Three types of marine fires were scheduled in the training exercise Wednesday under the direction of the center's instructor, Carl Weatherburn—a simulated engine room fire, a galley fire, and a fire in an open tank filled with oil. Participating in the public demonstration were members of the first class to complete the school's 32-hour course in fighting shipboard fires. The center also offers a 16-hour course in the control of fires aboard barges. Each course devotes equal time to classroom instruction and field training.

The Ohio facility is unique among the four Federal schools in that it combines both types of instruction at the same location. The five fire simulators it uses in its hands-on training include a two-deck ship mock-up which simulates fires in the engine room, bilge, galley, and a living compartment.

### MarAd Releases Updated Data Sheet

The Maritime Administration's U.S. Merchant Marine data sheet shows that, as of June 1, 1982, the privately-owned, deep-draft fleet of the U.S. merchant marine totaled 720 vessels with a record carrying capacity of over 24.7 million deadweight tons (DWT). The total comprises 577 ocean-going ships and 143 Great Lakes vessels.

Compared with the totals as of June 1, 1981, the number of ships in the U.S. fleet decreased by three vessels, but the fleet's capacity increased by 300,000 DWT. The gain in capacity reflects the larger sizes of vessels added to the fleet during the past 12 months and the comparatively small sizes of those retired from active service.

As of June 1, 1982, 35 merchant ships totaling more than 1.2 million DWT were under construction or on order in U.S. shipyards. The shipbuilding orderbook at that time consisted of 13 tankers, 6 intermodal carriers, 2 dry-bulk carriers, 9 tug/barges, 3 tanker barges, and 2 incinerator ships. Ten additional vessels were undergoing conversion.

Copies of a profile of U.S. maritime activity are available from the Office of Public Affairs, Maritime Administration, 400 Seventh Street SW, Washington, DC 20590.

The name of the author of "Pairing 'Schoolships' with Scholarship: SUNY Maritime College" was omitted from the July issue. The article was written by R. Thomas Cerny, Director of Admissions at the college since 1973. Mr. Cerny, who serves as an instructor during the summer sea terms whenever possible, is also a Commander in the Naval Reserve.

### Texas A&M Announces Fall Schedule

The Texas Engineering Extension Service's Oil and Hazardous Material Control Training Division has announced fall sessions for courses of interest to mariners:

A five-day course on hazardous material control will be held at Brayton Firemen Training Field in College Station, Texas. The course is open to fire and safety personnel, contractors, petroleum and chemical industry representatives, and others who may be involved with hazardous materials. Participants will improve their response skills through classroom instruction, demonstrations, and hands-on exercises using the latest equipment and technology available for hazardous material control.

An oil spill control course will be held in Galveston. Students will practice working within the framework of the law and the capabilities of available equipment and manpower, learning how to maximize their effectiveness under various spill conditions and minimize spill damage and expense.

For information, call (713) 845-3418 or write to the Oil and Hazardous Material Control Training Division, Texas Engineering Extension Service, The Texas A&M University System, College Station, Texas 77843.

### Ashland Marine Terminal Receives Safety Award

The Marine Repair Terminal of Ashland Petroleum Company was recognized recently for achieving 1 million employee hours without a lost-time accident. In a cermeony at Catlettsburg, Kentucky, Charles J. Luellen, President of Ashland Petroleum, presented the award to Edwin A. Burke, terminal manager.

The million-hour record required seven years and nine months of accident-free work, often under adverse conditions.

The Marine Repair Terminal provides a wide range of services to Ashland's fleet of towboats and barges, including tank barge cleaning, welding repairs, and pump and engine repairs. The group consists of 62 employees.

The terminal received the National Safety Council's "Award of Commendation" in 1979 and 1980 and in 1978 received the "Award of Honor" for the best record for small shipyards.

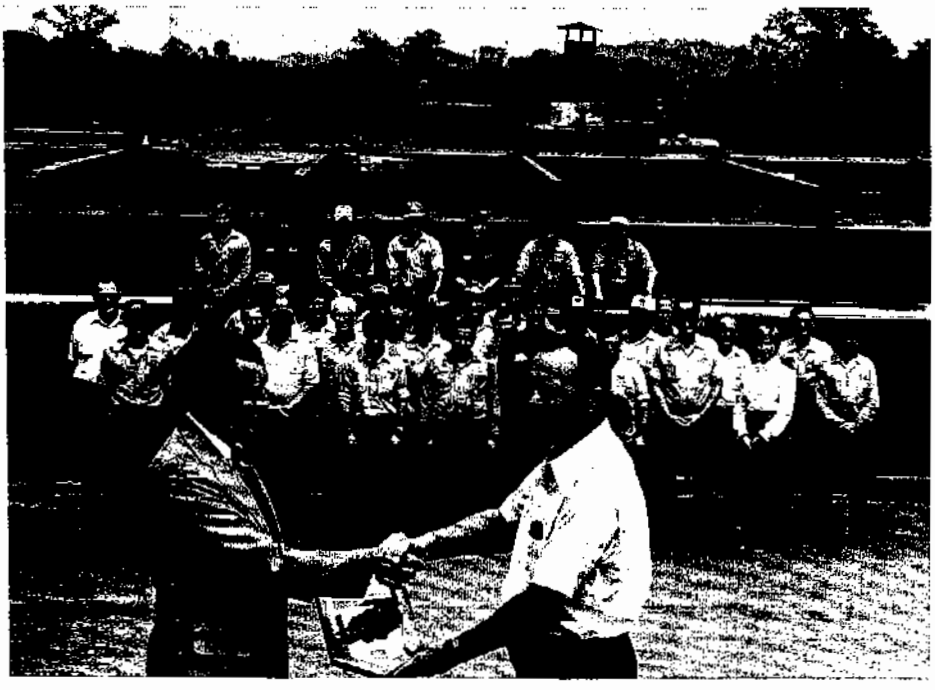
Ashland Petroleum Company is an operating division of Ashland Oil, Inc. The Marine Repair Terminal is located on the Ohio River in Ashland, Kentucky.

### Fifth Radar School Transferred by MarAd

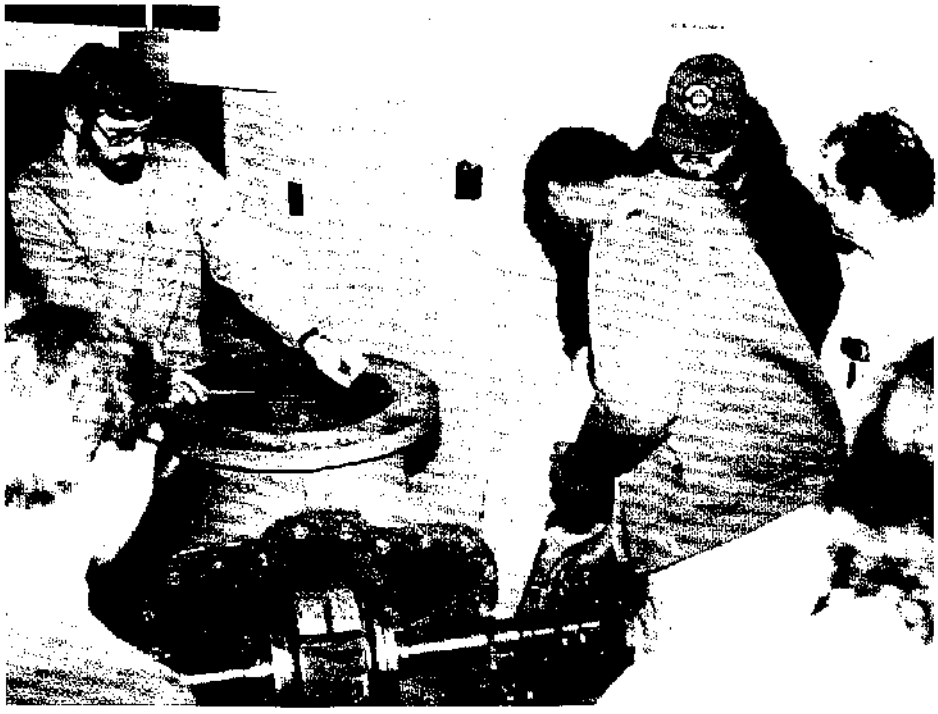
A Seattle, Washington, radar training school, the last of five operated by the Maritime Administration, has been transferred to the Masters, Mates and Pilots (MM&P)-Maritime Advancement Training, Education and Safety (M.A.T.E.S.) Program.

In announcing the transfer, Maritime Administrator ADM Harold E. Shear, USN (Ret.), noted that the action carried out President Reagan's policy of returning government operations to the private or local/state sectors whenever it is practical to do so. The radar training schools previously transferred by MarAd are located in New York, New York, San Francisco, California, Toledo, Ohio, and New Orleans, Louisiana.

M.A.T.E.S. is an industry-financed organization which administers training and safe-



*Ashland Marine Terminal manager Edwin A. Burke accepts a safety award on behalf of his 62 employees, who recently hit the 1 million mark in hours worked without a lost-time accident.*



*Jerry Williams, head of the Engine Department at Great Lakes Maritime Academy, which hosted the Lake Carriers' Association's QMED seminar on pumps and safety, explains the operation of a pump to seminar participants.*

ty programs in accordance with terms of collective bargaining agreements between the MM&P and steamship operators. It assumed operation of the Seattle school under terms of an agreement which requires the organization to continue U.S. Coast Guard-approved courses in collision-avoidance navigation radar for 36 consecutive months. When that commitment is met, the M.A.T.E.S. Program will receive full title to the school's equipment, including marine radar units utilizing electronically simulated visual displays. The agreement specifically provides that the radar school be open to all qualified mariners on equal terms regardless of union affiliation.

The Seattle facility provides training annually to about 230 deck officer personnel. The courses offered prepare officer candidates and licensed deck officers for original qualifications as Radar Observer or renewal by the Coast Guard of Radar Observer endorsements on their merchant marine deck officer licenses.

### Lake Carriers' Association Holds Courses

The Lake Carriers' Association, based in Cleveland, Ohio, recently completed sessions of its wire splicing and pump schools. The first, an intensive 20-hour course in marlinspike seamanship, covered life raft test and inspection, nomenclature of deck equipment and fittings, and fibre line and wire-rope splicing. The second, a three-day course on the engineering principles involved in safely moving a fluid from one place to another at high volume or pressure, concentrated on life-saving and firefighting equipment, pump operation, and troubleshooting and repair.

Future courses are planned on such subjects as paints and coatings, deck machinery troubleshooting, basic electrical theory, and preparation for Coast Guard inspection. Inquiries should be sent to Captain J. A. Wilson, Director of Training, Lake Carriers' Association, 1411 Rockefeller Building, Cleveland, Ohio 44113.

### New Reporting Service Established

*The Marine Operations Reporter*, published monthly by Maritime Advisory Services, Inc. (MASI), New York, is a new information service that monitors, digests, and reports on enacted and proposed changes in U.S. maritime regulatory policy.

This professional reporting service is targeted at shipowners, operators, and agents, tug and barge lines, port and terminal operators, naval architects, marine engineers and equipment manufacturers, oil and gas exploration companies, maritime lawyers, marine surveyors and consultants, shipbuilders, and marine service companies. It reviews all current regulatory activity, including dates of regulatory hearings which interested parties may attend, and cross indexes related regulations. The *Reporter*, which is published in three-ring binder format for easy updating and referencing, also includes special color-coded markers for updating copies of the Code of Federal Regulations.

The annual subscription price of *The Marine Operations Reporter* is $250. Further information and a sample


*A FLIR-equipped helicopter can conduct searches successfully even at night or during times of low visibility.*

issue will be sent to qualified inquirers upon request to MASI, Suite 3147, One World Trade Center, New York, New York 10048.

### Searching for Small Targets with FLIR

As reported in the cover story of the May 1982 issue of the *Proceedings*, the Coast Guard's Office of Research and Development has been evaluating the Forward Looking Infrared (FLIR) sensor for use in search and rescue missions. FLIR senses heat variation in objects and converts this into an image on a TV screen. Because FLIR is sensitive to heat and not light, its performance during low visibility and nighttime is as good as (and often better than) its performance during clear daytime conditions. FLIR is to be used primarily aboard the new Coast Guard HH-65A Short Range Recovery (SSR) helicopter.

During the fall of 1981, the Coast Guard Research and Development Center conducted experiments with a helicopter-mounted FLIR to test its ability to detect 15-to 19-foot boats, 4-and 7-man life rafts, and persons in the water. The FLIR was able to detect 60 to 90 percent of the boat and life raft targets in its field of view over the range of test conditions. Probability of detection of persons in the water was as high as 70 percent (except when white caps and rough sea conditions were present, when it dropped severely). Based on these results, the Coast Guard has concluded that FLIR exceeds all its other sensors in nighttime detection and classification of small, passive targets.

Copies of the project report, "Preliminary Assessment of U.S. Coast Guard Short Range Recovery (SSR) Forward Looking Infrared (FLIR) System Small Target Detection Performance," Coast Guard Technical Report No. CG-D-20-82, can be obtained from the National Technical Information Service (NTIS), Springfield, Virginia 22161.

### Ship Safety Achievement Awards Announced

The American Institute of Merchant Shipping recently announced the names of winners of the Ship Safety Achievement Awards.

The officers and crew of Delta Steamship Lines' SS DELTA NORTE received top honors for successfully extinguishing a serious fire under adverse weather conditions, thereby preventing loss of life, vessel, and cargo. The fire-fighting operation took place in the Atlantic Ocean off the coast of South America on May 15, 1981.

The officers and crew of the Military Sealift Command's USNS RIGEL received top honors for repairing and dewatering a flooded vessel under adverse weather conditions. The rescue operation took place in the Indian Ocean on September 6, 1981. A second MSC vessel, the USNS SOUTHERN CROSS, was also honored. The SOUTHERN CROSS received a Commendation for its humanitarian assistance to Vietnamese refugees adrift in the South China Sea during late September 1981.

The officers and crew of Sonat Marine, Inc.'s DRIVER were presented with a Citation of Merit for going to the assistance of a sinking vessel and rendering emergency first aid. The rescue operation took place in the Chesapeake Bay on December 23, 1981.

The Ship Safety Achievement Awards are presented jointly by the American Institute of Merchant Shipping and the Marine Section of the National Safety Council in

recognition of feats at sea where outstanding seamanship and effort on the part of everyone on a vessel are factors in saving lives or averting disaster.

### 1982 Editions of Port Series Reports Available

The Water Resources Support Center of the U.S. Army Corps of Engineers has announced publication of the 1982 editions of three of its Port Series Reports.

The reports in the Port Series describe the principal United States deep-draft ports. They consist of complete listings of a port's waterfront facilities, including information on berthing facilities, petroleum and coal-handling terminals, grain elevators, warehouses, cranes, transit sheds, marine repair plants, fleeting facilities, and floating equipment. Maps, which are overlaid on aerial photographs of the waterfront areas, show the location of the described facilities.

Port Series Report No. 14, describing the ports of Savannah and Brunswick, Georgia, can be ordered for $7. Report No. 60, describing Pittsburgh and ports on the Ohio, Monongahela, and Allegheny Rivers, Pennsylvania, is the first in the series devoted to the nation's inland ports. Copies of this report may be obtained for $11. Report No. 72, covering the ports of Natchez, Vicksburg, and Greenville, Mississippi, and ports on the Mississippi River Miles 255 - 620 AHP, is priced at $7.50.

Orders should be addressed to Port Series Reports (WRSC-CP), Kingman Building, Fort Belvoir, Virginia 22060 and should include a money order or check (in U.S. funds) payable to the Superintendent of Documents. Payment in advance is required for all purchases. Telephone orders will be accepted from holders of Superintendent of Documents Accounts or Interbank Credit Cards (Master Charge or Visa only).

### Coast Guard Officer Wins Boating Safety Award

Captain William J. Brogdon of Yarmouth, Maine, has won the sixth annual Captain Fred E. Lawton Boating Safety Award.

When not on duty directing Coast Guard operations in southern Maine, Captain Brogdon is an active recreational boatman and free-lance writer. He is a regular contributor to boating magazines such as *Motorboating & Sailing, Boating,* and *Salt Water Sportsman.*

During the past year, his articles of helpful advice to boaters included a series on practical navigation and explanatory pieces on the new Rules of the Road, outboard fueling, aids to navigation and night piloting, collision avoidance, distress communications, and boat handling through dangerous inlets.

Runner-up in this year's contest was Jim Martenhoff, Miami boating writer, editor, and columnist for *Salt Water Sportsman.* His 1981 work included an introduction to small-boat navigation for sport fishermen and articles on visibility and the importance of maintaining a proper lookout, interpreting wind and weather, lightning protection, using a marine radiotelephone, and selecting dependable engines.

The award is sponsored by Raytheon Company and is named for its late director of marine safety. The winners were selected by a panel of 22 judges from publications, broadcasting, and boating safety organizations.

Entries describing contributions during the current year will be accepted until December 31, 1982. ‡

*One of a pair of Waterford crystal decanters won by Captain William J. Brogdon, Jr., center, is admired by Mrs. Brogdon at a ceremony honoring her husband. D. Brainerd Holmes, right, President of Raytheon Company, also presented Captain Brogdon with a certificate and a $500 honorarium.*

The following items of general interest were published in the FEDERAL REGISTER between June 21, 1982, and August 16, 1982:

**Final rules:** CGD 09-82-18 Queen Beatrix Regatta, Lake Macatawa, Holland, Michigan, June 21, 1982. CGD 82-039 Inland Waterways Navigation Regulations, June 21, 1982. CGD 82-038 Coast Guard Areas, Districts, Marine Inspection Zones, and Captain of the Port Zones, June 21, 1982. CGD 78-128 Safety Rules for Self-propelled Vessels Carrying Hazardous Liquids, Correction, June 24, 1982. CGD 80-107 Documentation of Vessels, June 24, 1982 *(see page 7 of the January 1982 issue of the* Proceedings). CGD 13-82-07 Columbia Cup Unlimited Hydroplane Race, Columbia River, July 1, 1982. CGD 09-82-05 Joe Gimbrone Memorial Regatta, Niagara River, July 1, 1982. CGD 82-072 Editorial Name Change, July 1, 1982. CGD 79-034 Regulated Navigation Areas and Limited Access Areas, July 8, 1982. CGD 05-81-15R Anchorage Regulations; Annapolis Harbor, Annapolis, Maryland, July 8, 1982. CGD 80-147 Drawbridge Operation Regulations; Gulf Intracoastal Waterway, Houma Navigation Canal, Houma, Louisiana, July 19, 1982. CGD 81-107 Drawbridge Operation Regulations; Snohomish River, Steamboat Slough, East Slough, Washington, July 22, 1982. CGD 13-82-08 Water Festival Regatta, Willamette River, July 22, 1982. CGD 82-077 Safety and Security Zones, Quarterly List, August 2, 1982. CGD 07-82-02 Drawbridge Operation Regulations; Gulf Intracoastal Waterway, Clearwater, Florida, August 2, 1982. CGD 09-82-21 Coral Gables Challenge Cup, August 2, 1982. CGD 09-82-02 1982 Cleveland National Airshow, August 5, 1982. CGD 09-82-23 St. Joseph Venetian Festival, St. Joseph (Michigan) River, August 5, 1982. CGD 09-82-20 1982 Hydro National Championship, Niagara River, August 5, 1982. CGD 09-82-04 Special Anchorage Area at Fish Creek Harbor, Fish Creek, Wisconsin, August 16, 1982. CGD 82-020 Fleeting Facilities: Towboat Attendance of Barges, August 16, 1982. CGD 80-107 Documentation of Vessels, Correction, August 16, 1982. CGD 82-023 Casualty Reporting Requirements; interim final rule, August 16, 1982.

**Notices of proposed rulemaking (NPRMs):** CGD 08-82-01 Drawbridge Operation Regulations; Gulf Intracoastal Waterway, Algiers Alternate Route, Algiers, Louisiana, June 24, 1982. CGD 82-025 Drawbridge Operation Regulations of the Navigable Waters of the United States, July 9, 1982. CGD 81-080(A) Shipping Safety Fairways, Amendments and Additions, July 19, 1982. CGD 08-82-02 Anchorage Regulations, Lower Mississippi River, Louisiana, July 22, 1982. CGD 79-180 Disclosure of Safety Standards and Country of Registry, August 2, 1982. CGD 07-82-09 Drawbridge Operation Regulations, Lake Worth, Atlantic Intracoastal Waterway, Palm Beach County, Florida, August 2, 1982. CGD 82-074 Applications for Processing Bridge Permits, August 5, 1982. CGD 82-046 Regulated Navigation Area; San Pedro Bay, California, August 9, 1982. CGD 82-069 Casualty Reporting Requirements, August 16, 1982. CGD 81-081 Electronic Position Fixing Devices, August 16, 1982.

**Notices:** CGD 82-066 Notice of Small Vessel Towing and Salvage Policy Study; Request for Comments, July 21, 1982. CGD 82-057 Port Access Route Study, Notice of Study Results, Southern California, July 24, 1982. CGD 82-070 Port Access Route Study, Notice of Study Results, Fifth Coast Guard District, July 22, 1982. CGD 82-078 Notice of Study of Short Range Aids to Navigation Program of the United States Coast Guard, August 5, 1982.

Questions concerning regulatory dockets should be directed to the Marine Safety Council (G-CMC), U.S. Coast Guard, Washington, DC 20593; (202) 426-1477.

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### Berwick Bay Vessel Traffic Service (CGD 73-186)

The Coast Guard published an NPRM on August 16, 1982, proposing establishment of a Vessel Traffic Service (VTS) at Berwick Bay (Morgan City, Louisiana) similar to the one presently operating under a Coast Guard order. These regulations would require all vessels to comply with certain vessel traffic directives. The proposed regulations are intended to prevent collisions, rammings, and groundings and

to protect the area from the environmental damage which can result from such accidents.

For further information contact Ed LaRue, U.S. Coast Guard (G-WWM-2), Washington, DC 20593; (202) 426-4958.

### Subdivision and Stability Regulations (CGD 75-023)

The subdivision and stability regulation are currently spread among different parts of Titles 46 and 33 of the Code of Federal Regulations. On August 16, 1982, the Coast Guard published an NPRM proposing that these regulations be gathered into a newly created Subchapter S of Title 46. This would make the regulations easier to understand and apply.

For further information contact LCDR Kevin Feeney, U.S. Coast Guard (G-MTH-5), Washington, DC 20593; (202) 426-2187.

### Cargo Transfer Procedures Manual for Tank Vessels (CGD 75-148)

The Coast Guard has withdrawn its proposal to require tank vessels to carry and use a manual of cargo transfer procedures. This rule would have implemented a National Transportation Safety Board recommendation that all chemical tank vessel operators be required to keep up-to-date operating manuals on board showing proper operation of piping systems for anticipated transfer operations. The existence of regulations similar to this proposal makes further rulemaking unnecessary. A notice terminating the rulemaking was published July 19, 1982.

For further information contact CDR David Strasser, U.S. Coast Guard (G-MVI-2), Washington, DC 20593; (202) 426-2190.

### Shipping Papers for Foreign-flag Tank Vessels (CGD 76-081)

The Coast Guard is terminating its proposal to require foreign-flag tank vessels to carry shipping papers on board while in U.S. waters. This proposal was found to be a duplicate of an existing requirement in Title 19 of the Code of Federal Regulations. A notice of termination was published July 19, 1982.

For further information contact CDR David Strasser (same address as in preceding Keynote).


Rip Current

**TAKE THE EASY WAY OUT**

A break in the wave pattern, a discoloration in the water. Sharp-eyed swimmers often can spot and avoid a rip current, the strong, narrow outflow of ocean water that carries back to sea the water brought in by waves.

If you're caught in such a current, don't panic. They're seldom more than 10 to 20 feet wide. Swim across the current, parallel to the beach and you'll be out of danger soon.

Or relax and let the current carry you seaward to the riphead, where it slows down. Then you can swim ashore parallel to the rip current but outside its seaward pull.

Don't fight a rip current. Take the easy way out.

**A public service message from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce.**

### Removal of New York Vessel Traffic Service Regulations (CGD 77-087)

On August 2, 1979, the Coast Guard published a rule establishing operating procedures for the New York Vessel Traffic Service. The rule was scheduled to become effective on September 18, 1979. Certain necessary equipment proved difficult to obtain, however, and the effective date of the rule was delayed indefinitely. The Coast Guard has found it necessary to suspend the New York VTS, and on August 5, 1982, a rule was published removing the New York VTS regulations from the Code of Federal Regulations.

For further information contact LT J. S. Burnett, U.S. Coast Guard (G-WWM-1), Washington, DC 20593; (202) 426-1940.

### Deepwater Port Liability Fund (CGD 79-158)

The Deepwater Port Liability Fund will provide for settlement, without fault, of claims for cleanup costs and damages incurred as a result of oil spills from deepwater port activities. The interim final rule for this rulemaking was published on June 24, 1982. The regulations detail the policies, procedures, and administrative practices for overall management and oper-

ation of the fund.

For further information contact Frank Martin, U.S. Coast Guard (G-WP-5), Washington, DC 20593; (202) 472-5052.

### Regional Examination Centers Established (CGD 82-033)

Because of budgetary considerations and personnel restrictions, the Coast Guard can no longer administer the licensing and certificating of seamen at every location of an Officer in Charge of Marine Inspection (OCMI). Instead, the Coast Guard has established 16 Regional Examination Centers (RECs) to perform these functions. The RECs will be located in:

Boston
New York City
Baltimore
Charleston, South Carolina
Miami
New Orleans
Houston
Memphis
St. Louis
Toledo, Ohio
Long Beach, California
San Francisco
Seattle
Anchorage
Juneau
Honolulu

In addition, Traveling Examination Teams (TETs) will be formed to administer exams in areas not close to RECs where a sufficient group (usually 10) exists in one place (such as a school) to merit travel to that area. Processing of applications and renewals will be done by mail to save time and money for those involved with the licensing process.

For further information on the final rule, published July 1, 1982, contact CDR Scott D. McCowen, U.S. Coast Guard (G-MVP-5/14), Washington, DC 20593; (202) 426-2240.

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### Actions of the Marine Safety Council

The Marine Safety Council considered the following regulatory projects in July and August:

**CGD 77-084 Licensing of Pilots**

This is an existing project which was proposed in 1981. Following a series of hearings, the project was rewritten extensively. The Council has decided to extend the scope of the rewritten proposal to address the issue of pilot qualifications for different levels of service. The Council supports the concept that pilot licenses be divided into categories according to the size of the vessel being controlled. The larger vessels, naturally, would require a higher level of qualification.

**CGD 81-051 Charges for Coast Guard Aids to Navigation**

This project would allow the Coast Guard to revise the fees charged for Aids to reflect their true cost. The cost tables have not been updated since 1967.

**CGD 82-069 Casualty Reporting Requirements**

The Council approved a work plan which proposes eliminating the costs of salvage, gas freeing, and drydocking from the $25,000 reporting threshold for property damage. The rationale for this change is that these costs actually are not indicative of the amount of damage that a vessel has suffered. The purpose of the monetary threshold is to exclude casualties of no great consequence from reporting requirements. The expenses described above could inflate the cost of repair beyond the reporting threshold, resulting in inaccurate statistical data on the severity and frequency of accidents.

**CGD 82-075 Exposure Suits for MODUs, Offshore Supply Vessels, and Other Oceangoing and Coastwise Vessels**

This project would require the vessels listed in the project title to carry approved exposure suits when they are operating in designated (cold) waters. With the exception of MODUs, vessels using enclosed lifeboats would be exempted from the requirement to carry the suits. In addition, the proposal would allow certain classes of vessels to carry the suits in lieu of life vests. The suits are as buoyant as vests and afford greater protection against hypothermia. ‡

**Please enclose your mailing label when sending in a change of address. Allow eight weeks for change to take effect.**

# *The End of the Seasick Blues*

**by CDR A. M. Steinman**
**Chief, Special Medical Operations Branch**

This article is addressed to all those crewmen who, for some reason, think that seasickness is a problem that's "all in your head," and that the medications to prevent seasickness are nothing but sugar and water. There are even some people who think that there is something "unmacho" about having to take anti-seasickness medications or that "experienced sailors don't get seasick."

Let me set the record straight. It is a medical fact of life that anyone will get seasick under the right conditions. This has been demonstrated over and over again at a United States Navy medical laboratory in Pensacola, Florida. The Pensacola facility performs research on motion sickness using a special rotating room which can simulate any desired degree of pitch, roll, and yaw. Technicians there often encounter swaggering, macho-type personnel who can bench-press a Volkswagen, do one-handed push-ups with refrigerators on their backs, exude the "right stuff" from every pore, and claim they can't be made seasick. A few minutes in the rotating room is about all it takes to reduce the "macho man" to heaving jelly. So much for seasickness being unmacho. Now as for the notion that seasickness is "all in your head" (meaning it's only a psychological problem and not a "real" problem)—baloney! Seasickness is caused by overstimulation of the vestibular apparatus of your inner ear, which sends nerve impulses along the eighth cranial nerve to your brain and initiates nausea and vomiting. In other words, it's a real, physical problem, not some imagined psychological phenomenon seen only in the fainthearted. So it doesn't make any sense to scoff at your shipmates for getting seasick, any more than it would to scoff at them for getting the flu.

OK, you say, so what if I admit to being seasick? What can you do to cure it? Granted, common remedies such as fresh air, soda crackers, watching the horizon, and sucking on lemons provide little lasting relief. Even modern medicine has been remarkably unsuccessful in curing and preventing this age-old malady; traditional medications are only partially effective and may leave you feeling drowsy.

An end to *mal de mer* may be on the way, however. Recent medical research has shown that a combination of two drugs is by far the most effective treatment available for preventing seasickness. These two drugs (neither of which, incidentally, works well by itself) are "promethazine" (an anti-histamine) and "ephedrine" (a common decongestant). For maximum

effectiveness the medications should be taken one to two hours before you get underway and at six-hour intervals as needed thereafter. The dose is 25 mg. of each. Promethazine and ephedrine should be available from your ship's doctor.

The medications just described are effective; they work for the majority of people. Many crewmen are reluctant to use the medications, however, because they are afraid to let the master or their shipmates know they need them. And so these individuals go out on ships or boats, get sick, and become incapacitated or perform in a sub-par manner. This is obviously not what is expected from professional sailors. If you know you are prone to seasickness, by all means take advantage of the available anti-motion-sickness medication. You're no help at all to your shipmates if you're leaning over the rail half the time. I speak from personal experience—I've been there. I used to get seasick. Not anymore, though—now I take advantage of the available medications. I can't afford to be seasick. I don't really care whether anyone knows I get seasick and that I require medications to prevent it. My major concern is putting out my best effort. I hope you feel the same way.

There are a few people for whom the anti-seasickness medications do not work. They either get seasick despite the medications or suffer from the side effects (drowsiness, etc.) of the medications. A new anti-motion-sickness drug has recently been marketed which seems to work for some of these people. This drug is contained in a small patch which is worn behind the ear, and the medication is slowly absorbed through the skin. The chemical name of the drug is scopolamine. This medication, too, has side effects (dryness of mouth, drowsiness, etc.), and they may appear more frequently than those of the other drugs. However, some people who get no relief or experience side effects after taking the most commonly prescribed medications have reported good results with the topically applied scopolamine.

I hope that after you've finished reading this article you'll feel a little less hesitant about seeking relief from a malady that's been around as long as there have been ships on the sea. There's no need to feel embarrassed about getting seasick. You should feel embarrassed, however, if you are letting seasickness interfere with your performance, especially when the means exist to prevent it. ⚓

# Maritime Medical Advice

# Offered by Commercial Firms

Several commercial sources for medical advice at sea have been established, and others may be created in the future. These companies, operating on a nationwide or local basis, generally provide medical advice to ships at sea which subscribe to their services. Normally, these companies inform their subscribers that they should contact the Coast Guard as a last resort if commercial stations are unreachable and/or busy.

The companies, their addresses, and telephone numbers are as follows:

GEOMET TECHNOLOGIES, INC.
1801 Research Boulevard
Rockville, MD 20850
(301) 424-9133

MEDICAL ADVISORY SYSTEMS, INC.
Box 193
Chaneyville Junction
Owings, MD 20736
800-368-2110

MARMEDIC, INC.
1770 Tchoupitoulas
New Orleans, LA 70130
(504) 529-3088

# "THINK GREEN"

Over the next six years, the Coast Guard will be making changes in about one-third of its aids to navigation. Most of these changes, which will bring the U.S. system into line with a new worldwide buoyage system, had been planned independently by the Coast Guard.

Black buoys are to be changed to green. In 1980 - 1981, green buoys were tested in 19 sites selected across the U.S. to cover as many types of water conditions, visual backgrounds, and classes of users as possible. The tests showed that a dark green buoy could be identified as green (rather than some other color) from farther away than a black buoy could be identified as black. Early color identification is, of course, very important for an aid to navigation.

Green buoys have gained wide acceptance in Europe, primarily because of their high visibility against marine surroundings. The U.S. had adopted and implemented green as the color for port-hand daymarks by 1973, and Congress in 1976 passed Public Law 94-546, "allowing changes in colors of buoys based on improved technologies." Making port-hand buoys the same color as daymarks and lights will give mariners a logical, consistent system.

A second change to be carried out involves mid-channel buoys. These, which until now have been vertically striped black-and-white, will henceforth be vertically striped red-and-white. Black-and-white, the color scheme used to camouflage men-of-war in World War I, is difficult to see, especially when a buoy is spotted with ice or sea-gull guano. A red-and-white mid-channel buoy has been tested at the mouth of the Mississippi River and has been well received by mariners. The new color combination has proved to be so effective that, during its first year on station, the aid was rammed only once every three months, rather than once every month as it had been when it was black-and-white.

In addition to making the changes just described, the Coast Guard will be replacing the white lights on lateral aids with red and green lights.

Not surprisingly, the changes planned by the Coast Guard to give mariners better signals and improve navigation safety fall in line with the provisions of the worldwide buoyage system recently agreed upon by the International Association of Lighthouse Authorities (IALA). On April 15 most of the maritime nations of the world signed an agreement to modify their buoyage systems to conform to one basic system with several optional features.

The signing ceremony for the International Association of Lighthouse Authorities Maritime Buoyage Agreement was held April 15, 1982, in the dignified atmosphere of the Maison de l'Amérique Latine in Paris, France. RADM Richard A. Bauman, the Chief of the Coast Guard's Office of Navigation, signed for the United States. Twenty-four other maritime nations were present for the official signing, and an additional 19 nations entered into the agreement by deposit of their declaration with the Secretary General of IALA. Mr. H. Nagaoka, Director General of the Aids to Navigation Department in Japan's Maritime Safety Agency and President of IALA, called the signing of the Buoyage Agreement "not only a remarkable achievement in the history of the Association but also one of the most outstanding accomplishments in the development of safety of navigation all over the world."

## History of Maritime Buoyage Practices

As recently as 1976, more than 30 different buoyage systems were in use around the world. This meant that the mariner had to learn many different systems, and the potential for confusion and accidents was great.

Over the long history of vessel navigation, maritime buoyage practices were established on a local basis. In different areas of England, for instance, local marking practices developed independently of one another. According to an unsubstantiated story, the U.S. custom of "red right returning" was brought back 130 years ago from Liverpool—what the U.S. didn't realize was that Liverpool was the only European port using that system.

Efforts to unify the world's buoyage systems date back as far as 1889, when several nations agreed to follow the British practice of placing black can buoys on the port side of channels and red conical buoys on the starboard side. Unity reigned briefly, however, lasting only until lighthouse authorities began putting lights on buoys. Some countries decided to put red lights on the port-hand buoys, apparently to conform with the practice of some local harbor authorities of marking the port side of harbor entrances with red lights. Other countries, logically enough, decided to put red lights on red starboard-side buoys.

Over the years, two different marking systems founded on unrelated principles were developed. Under the lateral system (at present, the U.S. uses this system exclusively), the port and starboard sides of a recommended route are marked in accordance with an agreed-upon direction based on flood currents (the color, shape, number, and lighting of the buoys serve as a guide to the mariner). Under the cardinal system, buoy colors and markings indicate the compass quadrant of deepest water or safe passage around a danger and, in some cases, draw attention to a feature in the vicinity of the buoy. The cardinal system is particularly useful in the open sea, where the direction of buoyage might not be obvious.

The most successful past attempt at unification was made by the League of Nations, which in 1936 proposed an "Agreement for a Uniform System of Maritime Buoyage." This agreement recommended red to port on lateral aids. World War II, however, intervened, and the proposal was scuttled.

The International Association of Lighthouse Authorities was founded in 1957. IALA is a non-governmental association bringing together in a working forum the services and organizations responsible for aids to navigation in the 80+ member nations. In 1965 it established a technical committee to study the changes and additions necessary for buoyage system unification. Lacking a strong mandate from the world community for rapid change, however, the committee made no real progress toward a simplified marking system. It took a series of accidents in the Straits of Dover in 1971 to bring about the necessary breakthrough.

Compromise was a key factor in the negotiations leading to the agreement to harmonize the world's buoyage systems. Initial proposals were for worldwide adoption of the red-to-port lateral system. The United States, with its almost 50,000 Federal and 40,000 private aids, and Canada, with its 30,000 aids to navigation, were urged to completely change their color systems and abandon red-to-starboard for the European and Asian red-to-port. Ten years of negotiation, planning, and compromise ensued. The Western Hemisphere's concession to use green rather than black on port-hand inbound buoys was matched by the Eastern Hemisphere's agreement to use conical (nun) buoys to starboard and cylindrical (can) buoys to port. The Eastern Hemisphere's concession makes lateral shape identification universal.

## Stimulus for Agreement

In early 1971, the tanker TEXACO CARIBBEAN collided with another ship and sank near Varne Bank in the English Channel. A buoy tender was dispatched promptly to install wreck marks and to stand by to warn traffic of the wreckage. Within a few hours, the BRANDENBURG, a West German cargo carrier, misinterpreted the tender's signals, struck the wreck, and sank. A few weeks later, the Greek freighter NIKI also hit the sunken wreck and sank, killing all on board, although by this time a lightship was on station and several wreck buoys had been installed. In the following weeks there were many narrow misses as vessels avoided disaster only after warning flares were fired from the two lightships then in attendance. Fourteen wreck buoys were installed. These events, played out in such a short period in one of the world's most heavily traveled straits, provided a dramatic example of the confusion that could result from authori-

ties' inability to mark a hazard in a way all mariners could understand.

Responding to these disasters, the International Maritime Organization (then the Inter-Governmental Maritime Consultative Organization) proposed formulation of a joint IMCO/IALA Committee on the International Unification of Buoyage Systems. It soon became clear that the stalemate over lateral colors (the European nations wanted to have red buoys to port when returning from sea, and the nations in the Western Hemisphere wanted to maintain "red right returning") would continue to bar the way to total unification.

In 1975 IALA announced that the term "unification" would be dropped in favor of "harmonization." This cleared the way for eventual agreement on a single system with two regional variations. *(See accompanying map)* Region A is red to port, and Region B is red to starboard. For both regions, the IALA Maritime Buoyage System can be thought of as a catalogue or inventory of lateral markings, cardinal markings, and safe water and special marks. Individual lighthouse authorities may choose to use any or all of these, as they see fit. The only difference between Region A and Region B is which color is to port and which color is to starboard. The meaning of all other color markings and all shapes and rhythms are identical for both regions.

Europe, Australia, New Zealand, Africa, the Persian Gulf countries, and most of Asia chose to be in Region A. Implementation of the rules developed for the red-to-port region began in 1977, were amended in 1980, and should be completed in 1985.

The U.S., along with the other countries of North, Central, and South America, Japan, the Republic of Korea, and the Philippines chose to be in Region B. Rules for the red-to-starboard region were completed in 1980, and implementation is only now beginning.

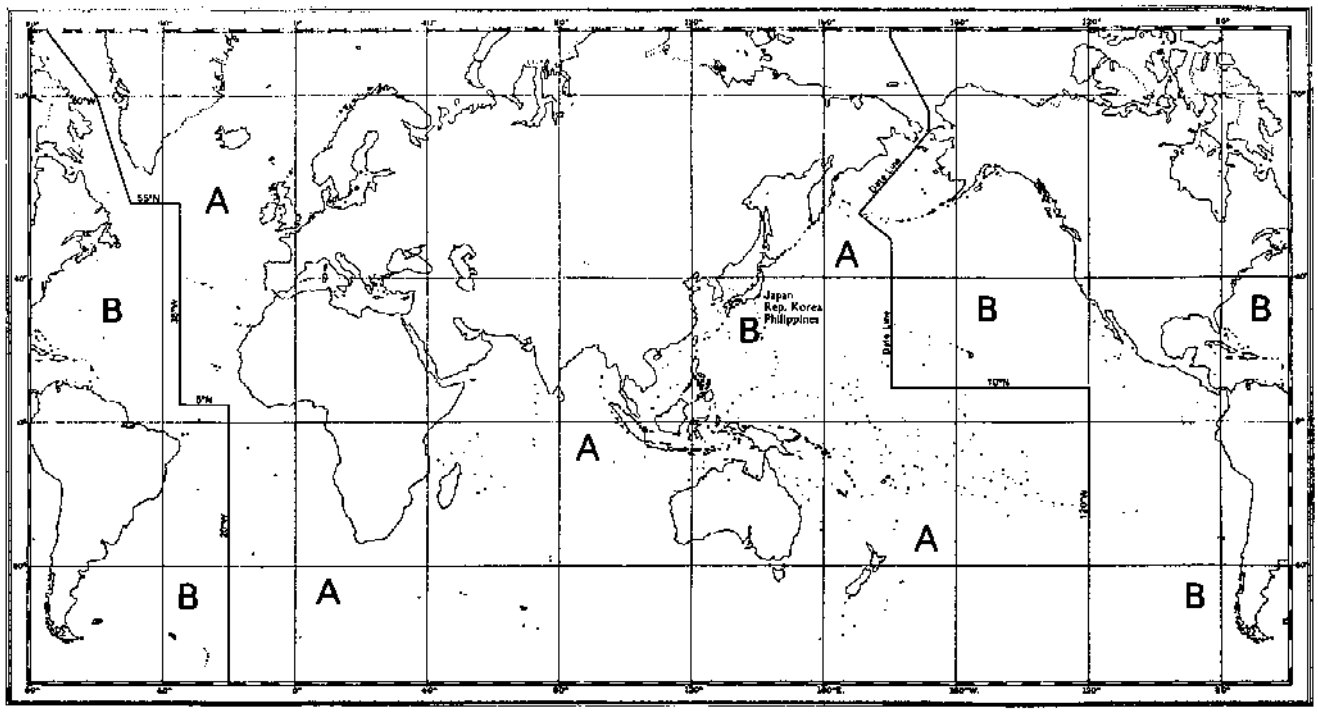
**The Extent of the Changes**

The majority of U.S. aids will not be affected, and conversion will be gradual. One Coast Guard officer suggested that the theme of the conversion program could be "If we didn't tell you we were changing, you probably wouldn't even notice." As stated earlier, the U.S. had already planned to make most of the changes now called for by the IALA system, and those changes will affect only about one-third of U.S. aids to navigation. Only about three percent of U.S. aids will require changes not otherwise planned or already permitted.

The changes will begin in 1983 in the waters shared with Canada. So that no additional funds will be required, the Coast Guard plans to convert its buoys over a six-year period as they

IALA MARITIME BUOYAGE SYSTEM

Buoyage Regions A and B, November 1980



**Markings from the IALA Maritime Buoyage System to be incorporated into U.S. aids to navigation starting in 1983**

Starboard-hand Lateral Aids:
Color: Red
Shape: Nun or lighted
Light (when fitted): Red
Rhythm: Any, other than Comp Gp Fl (2+1)
**Changes:** Lights - from white or red to red only

Port-hand Lateral Aids:
Color: Green
Shape: Can or lighted
Light (when fitted): Green
Rhythm: Any, other than Comp Gp Fl (2+1)
**Changes:** Color - From black to green
Lights - From white or green to green only

Preferred Channel to Starboard:
Color: Horizontally banded green over red over green
Shape: Can or lighted
Light (when fitted): Green
Rhythm: Comp Gp Fl (2+1)
**Changes:** Color - From black to green
Lights - From white or green to green only
Light rhythm - From I Qk Fl to Comp Gp Fl (2+1)

Preferred Channel to Port:
Color: Horizontally banded red over green over red
Shape: Nun or lighted
Light (when fitted): Red
Rhythm: Comp Gp Fl (2+1)
**Changes:** Color - From black to green
Lights - From white or red to red only
Light rhythm - From I Qk Fl to Comp Gp Fl (2+1)

Safe Water:
Color: Vertically striped red-and-white
Shape: Spherical or lighted (if lighted, red topmark)
Topmark (when required): Single red sphere
Light (when fitted): White
Rhythm: Morse "A"
**Changes:** Color - From black-and-white to red-and-white
Shape - Non-spherical buoys will have topmarks
Nun and can buoys will not be used

Special purpose:
Color: Yellow
Shape: Optional, but not conflicting with navigational marks
Light (when fitted): Yellow
Rhythm: Any, other than Qk Fl, Gp Qk Fl, Gp Qk & L Fl, V Qk Fl, Gp V Qk Fl, Gp V Qk Fl & L Fl, Gp Fl (2), Iso, Occ, L Fl, Mo (A), or Mo (U)
**Changes:** Color - From various color combinations to yellow
All special purpose-aids will be yellow and, when lighted, will use yellow lights.

Information and Regulatory Markers:

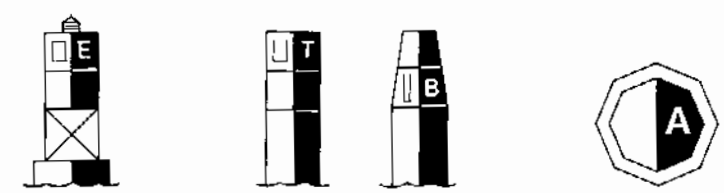
## PRESENT SYSTEM


Lighted Nun Daymark

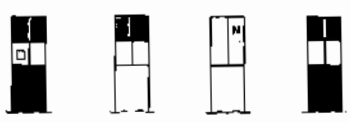

Lighted Can Daymark


Lighted Can Daymark


Lighted Nun Daymark




Lighted Can Nun Daymark



Buoys

Daymarks

Cans

Daymark

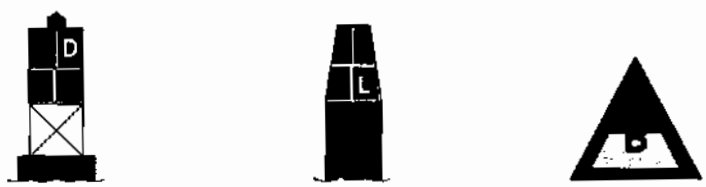
## MODIFIED SYSTEM

TO BEGIN 1983 - TO BE COMPLETED BY 1989


Lighted Nun Daymark

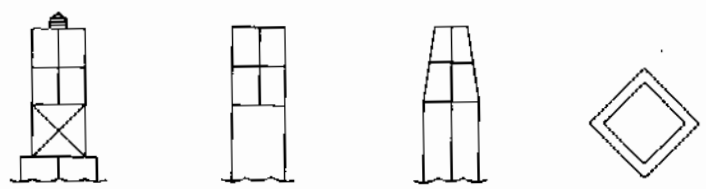

Lighted Can Daymark


Lighted Can Daymark




Lighted Nun Daymark


Lighted Spherical Daymark



Lighted Can Nun Daymark

NOTE: Information and Regulatory Markers will not be changed.

come up for their regularly scheduled overhaul and repainting. Lights will be changed as batteries expire. Solar panels are being installed by the Coast Guard on many aids to provide an inexpensive energy source. This addition will help reduce costs where lamp sizes must be increased to compensate for a color change.

The changes to be made are as follows *(see accompanying charts)*:

**Lateral aids** - The color red, the shapes, red and green light colors, and light rhythms will not change. The major changes under the new U.S. system will be making the port-hand buoys (numbering about 10,000) green and eliminating white lights on lateral aids.

**"Junction" buoys** - The U.S. has historically marked both junctions and bifurcations with horizontally-banded buoys called "junction" buoys. Under IALA, horizontally-banded buoys used to mark bifurcations are called "Preferred Channel" or "Modified Lateral Buoys." Aproximately 550 aids will be changed from banded black-and-red to banded green-and-red, and the light rhythm will become composite group flashing (2+1) rather than interrupted quick flashing.

**Mid-channel and fairway aids** - IALA calls aids used to mark mid-channels and fairways "Safe Water Marks." As described earlier, these buoys will change from vertically striped black-and-white to vertically striped red-and-white. Also, the unlighted/non-sound version (numbering about 80) will be replaced with spherical buoys, and the lighted/sound version will wear a topmark. The latter is the only buoy in the present U.S. system that will require a topmark. This feature should not cause much concern, as there are fewer than 275 in the entire system.

During the spring of 1982, the Coast Guard's Office of Navigation held public meetings on the East, West, and Gulf Coasts, as well as the Great Lakes, to assess public reaction to the planned changes in the U.S. buoyage systems. All segments of commercial and recreational maritime interests participated in these public forums. The reaction of the maritime community was largely favorable, and representatives of international shipping expressed strong support for the changes. It was the consensus of the many interested parties that conversion from black buoys to green should present no difficulties for the mariner.

**Special purpose aids** - The IALA agreement provides that these be colored yellow. There are approximately 1,500 aids which will need to be changed to yellow. These aids, when lighted, will display yellow lights.

For now, the Coast Guard does not plan to use topmarks on lateral or special aids. Further, it has no immediate plans to use cardinal marks and will use very few, if any, isolated danger buoys, and then not for several years. It believes isolated dangers can continue to be marked very effectively with lateral aids.

The changes do not affect lighthouses, sector lights, leading lights, lightships, LNBs, or information and regulatory markers. Crossing marks on the Western Rivers will not be changed and may continue to display white lights.

A color brochure showing the changes to be made has been prepared and will be available from Coast Guard District offices and the Coast Guard Auxiliary in the fall of 1982. Local Notices to Mariners will be issued as changes are carried out. The National Ocean Survey and the Defense Mapping Agency will place an explanation note on each chart issued during the six-year conversion period. The note will point out that green is the same as black on lateral buoys, red-and-white is the same as black-and-white on mid-channel buoys, etc.

Conversion to the IALA Maritime Buoyage System will be completed by 1989. ⚓

**The U.S. Maritime Marking System**

| | Approx. Number | % |
|---|---|---|
| Aids now complying | 30,000 | 64 |
| Starboard-side: white lights to be made red | 2,000 | 5 |
| Port side: black buoys and/or white lights to be made green | 13,000 | 27 |
| Mid-channel: unlighted to have spherical shape and black/white to be made red/white | 350 | 1/2 |
| I Qk Fl to be changed to Comp Gp Fl (2+1) on preferred channel | 220 | 1/2 |
| Non-lateral special purpose to be made yellow | 1,500 | 3 |
| | | 100% |

# Plotting the Course of the Rules of the Road

## Part II

by Charles F. Lehman

*The following article has been adapted from "The Unruly History of the Rules of the Road," an article Mr. Lehman prepared for the December 1981 issue of the* Proceedings *of the U.S. Naval Institute; copyright © 1981, U.S. Naval Institute.*

Last month, Part I of "Plotting the Course of the Rules of the Road" traced the history of the rules from the years of the first agreements to the start of the 20th century. At the conclusion of Part I, the U.S. was using four separate and distinct sets of rules: a set for international waters, a set for the Western Rivers, a set for the Great Lakes, and a set for the Inland Waters. In addition, there was a separate set of pilot rules for each of the three groups of internal waters. Possibilities for confusion were mounting, and the problems were compounded by the increasing sophistication of ships.

As new technology was spawned by the Industrial Revolution, many mariners began to question the way governing relationships between vessels were determined. The increasing speed and size of ships demanded a review of existing collision laws.

In 1929 an International Convention on Safety of Life at Sea was held in London. Changes to the International Regulations for Preventing Collisions at Sea were among the issues discussed, and a complete revision of the regulations was submitted to the membership. However, the world's maritime nations, including the U.S., failed to ratify the changes.

A second Convention on Safety of Life at Sea was called in London in 1948. This convention resulted in new International Rules which went into effect in 1951. The new rules addressed several navigation problems (navigating seaplanes on water, for example), formalized the orders to the helmsman (which had informally been agreed to by all maritime nations in 1935), and added a blind bend signal. Also, the so-called "danger" or "doubt" signal made its first appearance in international law, although use of the signal was not mandatory.

Nine years after these rules became effective, another international conference was called, resulting in some further minor changes. This 1960 Convention finally recognized radar as a collision avoidance tool and covered the use of it in an annex to the rules. Further, the new rules prohibited small vessels from hampering large vessels.

Interested persons in the United States had been discussing the need to unify this country's conflicting rules of the road for years. In his first edition of *Rules of the Nautical Road*, Commander Raymond F. Farwell described the system in effect at that time as a

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"hodgepodge" and voiced the opinion that one set of rules should be sufficient. The text, printed in 1941 and issued by the U.S. Naval Institute, was considered by mariners, admiralty lawyers, and the courts as a definitive work.

Soon after the start of the Second World War, the old Board of Supervisory Inspectors, which by then had been renamed the Bureau of Marine Inspection and Navigation, was transferred by Presidential Executive Order to the Coast Guard for the duration of the war. This action gave the Coast Guard the authority to issue and supervise statutory navigation laws and pilot rules. The Coast Guard's authority in this area was made permanent in 1946.

In mid-1946 the Coast Guard published a booklet entitled "Comparative Rules of the Road and How to Obey Them." It had numerous plates illustrating location and placement of lights on vessels for each of the different sets of U.S. rules and the international rules. Related illustrations for the respective sets of rules were grouped together to make differences and similarities readily apparent. The booklet also contained many commonsense slogans, such as:

- "You never have the right-of-way through another vessel."
- "No rule requires a privileged vessel to hold course and speed until collision is inevitable."
- "Being privileged is no privilege."
- "An overtaken vessel is not as fast but she got there first."
- "Good seamanship, like some other things, takes a lot of practice to get good at it."
- "The best place to know the rules and the worst place to study them is in a collision approach."

In the late 1950s, the Western Rivers Panel of the Coast Guard Marine Safety Council formally endorsed the concept of a unified set of rules and urged the Coast Guard to develop a new code. The Coast Guard published a second comparative analysis of the various statutes and pilot rules in 1959 as a discussion paper. This version included the various changes which had occurred since publication of the 1946 booklet.

Noteworthy modifications included the extensive changes made to the Western Rivers Rules in 1948. For example:

- Instead of applying to all rivers flowing into the Gulf of Mexico, the rules now applied only to the Mississippi and its tributaries above the Huey P. Long Bridge, the Warrior River System, the Atchafalaya River, and the Red River of the North.
- Rule 18 differentiated between meeting vessels according to whether they were ascending or descending a river, giving certain privileges to the descending vessel.
- Rule 19 gave the descending vessel with a tow the right-of-way over a steam vessel crossing the river.
- The rules added statutorily the danger, blind bend, and departing berth signals.

In 1953, the lines of jurisdiction were again changed to remove the Warrior-Tomigbee and the Mobile River from the Western Rivers Rules and place them under the Inland Rules.

Between the time of the drafting of the 1960 international convention and its going into effect in 1965, a concentrated effort was made to unify the three different internal statutes governing the Western Rivers, Great Lakes, and Inland Waters.

The Maritime Law Association in November 1964 adopted a resolution directing one of its subcommittees to meet and cooperate with the Coast Guard on the collision rules. The goal was to achieve the maximum uniformity possible between the International Rules and the United States' three sets of national rules.

The Coast Guard set up a Rules of the Road Coordinating Panel in 1965 under the chairmanship of Mr. Nicholas J. Healy, who was also President of the Maritime Law Association at that time. This panel developed a draft set of unified rules which was widely circulated.

Great Lakes mariners voiced concern over the proposed rules, which deviated from what they felt was a tailor-made set of rules to promote safety on the Great Lakes. Western Rivers operators, though consulted at every step, could not agree among themselves on the changes necessary to meet the special concerns which some of them perceived. Nonetheless, the members reaffirmed their support for unification at the October 1965 meeting of the Western Rivers Panel, which was held in Pittsburgh.

A second draft was circulated by the Coordinating Panel in 1966. This version encompassed the special provisions concerning the downbound vessel rule which Western Rivers pilots had always considered necessary. The new draft added additional range lights which Western Rivers vessels would have to show when underway, pushing ahead, or towing alongside. The proposal also made an exception for most special Great Lakes rules. By paying tribute to these standards, the proposal, in one sense, defeated the very purpose of unification.

During this period bills calling for rules similar to the unified code were introduced in Congress. Although many groups with marine interests were supportive of these bills, there was a great deal of dissatisfaction within some groups because of all the exceptions being made. There was still no unanimity among Western Rivers operators. Some were adamantly opposed to any change in the existing rules, while numerous others thought uniformity was an idea whose time had come.

No action was taken on the legislation, as it was deemed necessary to await completion of a revision of the International Regulations for Preventing Collisions at Sea (known as the COLREGS) being prepared by a subcommittee of the Inter-Governmental Maritime Consultative Organization (recently renamed the International Maritime Organization). IMCO recognized the technical changes taking place in ships and shipping and met to discuss recodifying the International Rules entirely, even though the latest version had been in effect only a few years. Since changes were occurring so rapidly, the domestic groups working on unification considered it wise to wait until the new set of International Regulations was developed. The draft changes being suggested by IMCO were a departure from the traditional format which had evolved over the years with only cosmetic changes.

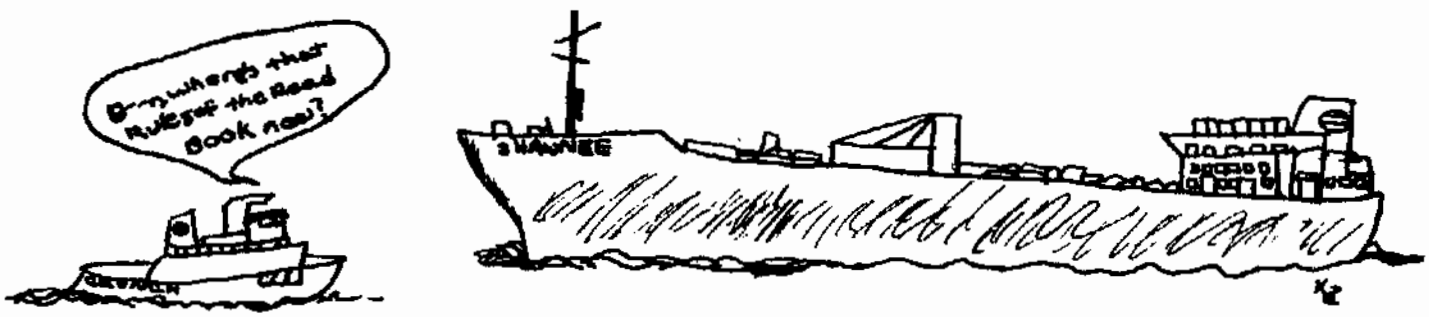
In October 1972, delegations from the world maritime nations convened in London and formulated what are now known as the 72 COLREGS. The convention setting forth the regulations went into full international force on July 15, 1977, after it had been ratified by the required number of nations representing a significant portion of the tonnage of the merchant vessels of the world fleets. Public Law 95-75, signed by the President on July 27, 1977, made the 72 COLREGS part of the U.S. statutory code.

The same year the 72 COLREGS became effective, the Secretary of Transportation formally established the Rules of the Road Advisory Committee (RORAC). Twenty members were appointed from geographically diverse areas of the country to represent all sectors of the maritime community. The committee's function was to provide advice and consultation to the Commandant of the Coast Guard on collision rules and regulations.

The unification of the United States rules was a main agenda item for the first meeting of this committee. It was also the main topic of discussion at all of the subsequent meetings.

The Chairman of RORAC from its inception was Mr. Gordon Paulsen, who for many years also chaired the Maritime Law Association's Navigation and Coast Guard Committee. Under his able direction, RORAC commenced the laborious task of drafting a set of unified domestic rules. RORAC was guided by two considerations. 1) The provisions of Rule 1(c) of the international regulations directed that nations with "special rules" ensure that their

"The best place to know the rules and the worst place to study them is in a collision approach."



navigational standards conform as closely as possible to the 72 COLREGS. 2) Even more important was the need to produce the safest possible code for the mariner who had to use and abide by the rules on U.S. internal waters.

During the debate over various passages in the drafts circulated to the members of RORAC, one member suggested that the following rule be considered:

> "When two or more vessels meet, no matter what the aspect, whether on rivers, harbors, roadsteads, bays, open oceans, or any body of water in which they can float, each shall immediately stop and wait for the other to pass."

Although this tongue-in-cheek command, if carried out, probably would have prevented all future collisions and eliminated the need for additional requirements, the Committee decided the needs of commerce and pleasure would be better served if a somewhat more detailed set of rules were promulgated.

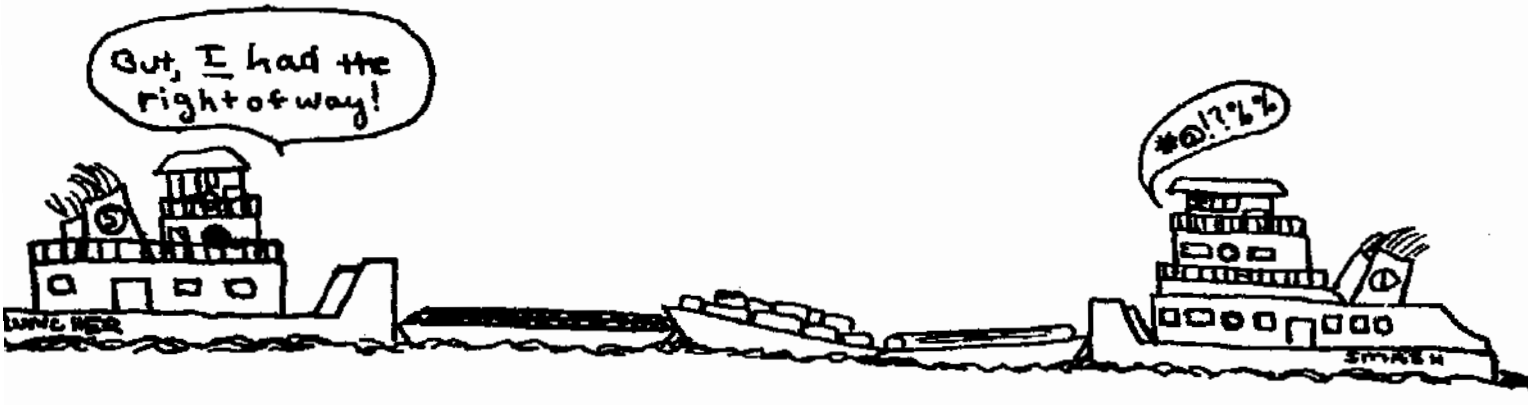
The efforts of the Committee ultimately resulted in a bill's being introduced in the House of Representatives during the 96th Congress. On June 12, 1980, Congressional hearings on "H.R. 6671" were held by Representative Mario Biaggi (D-NY). The bill, with minor modifications, was passed overwhelmingly by the House and sent to the Senate for consideration. The Senate Commerce Committee favorably reported the bill to the full Senate with only a few technical changes. Its report included most of the analysis of the provisions of the rules which had been submitted by RORAC. This interpretive report reflected the intent of Congress and will be of vital importance to future mariners who will use these rules.

On December 24, 1980, the President signed into law the Inland Navigational Rules Act (Public Law 96-591), set to go into effect one year later.

History has now come almost full circle. Our country's first general navigation laws, which applied to all vessels in all waters, diverged into one set of international rules and the three sets of regional rules which developed in response to different interests and ideas. The regional rules now have been replaced by a uniform set of national rules applying to all vessels navigating our domestic waters.

We also have an established mechanism to monitor the rules. RORAC (which Public Law 96-591 changed from the Rules of the Road Advisory Committee to the Rules of the Road Advisory Council) serves as an example that government and industry can work together to settle their differences and achieve common objectives. Were it not for this forum, vessels leaving port today might still be encountering as many as three sets of conflicting nautical standards en route to the open sea.

The purpose of navigation rules has remained constant since the days the first rules were codified: to prevent collisions and promote the safety of mariners. The rules themselves have not changed radically in substance but have evolved to meet the challenges presented by a rapidly developing and technologically changing world. When international or domestic navigation rules change in the future, as they are bound to do, the existence of agreed-upon, unified sets of rules will enable authorities to make the changes in a uniform and consistent fashion. ‡




"You never have the right of way through another vessel."

# Too Many Fires in the Iron

**by John F. McAnulty**
**Cargo Systems Branch**
**Marine Technical and**
**Hazardous Materials Division**

*Metal fires on ships are a phenomenon which is just beginning to be understood. Metal fires are different from other fires in that they burn at extremely high temperatures. They also present unique problems in firefighting. The three cargoes discussed in the following article (metal turnings, direct reduced iron, and zinc skimmings) have all been involved in metal fires. Awareness of the problems involved in carrying these cargoes and the special precautions which must be taken could serve to avert future fires.*

Iron and steel products are usually made from either iron or steel scrap. In recent years, several commercial processes have been developed for production of an alternative to scrap known as "direct reduced iron," or "DRI." DRI, iron ore from which the oxygen has been removed, is essentially a type of "manufactured scrap," higher-quality scrap of known composition.

Because of the large investment necessary for manufacturing steel, the steel industry was once dominated by large enterprises such as U.S. Steel. Conventional plants consisted of blast furnaces, converters, open-hearth furnaces, etc. The increasing use of electric furnaces has led to a proliferation of small, low-capital plants using DRI or scrap as the chief ingredient. This is a trend which is likely to continue, and future steel production can be expected to take place in many small steel manufacturing facilities spread around the world. As more and more of these plants are opened, the manufacture and shipment by water of scrap and DRI will increase.

**Metal Turnings**

Most scrap presents no fire hazard in shipping, but that is not true of the lowest-price steel scrap. This scrap, called metal turnings, is a product of machine shop operations and consists of turnings, cast iron borings, and shavings. Metal turnings are often coated with oil (sometime combustible), have a high percentage of fine particles—approximately 40 percent—and thus a high surface-to-volume ratio (also a fire hazard), and may be contaminated with paper, wood, rags, and many other combustible materials. Since they have a tendency to ignite spontaneously, metal turnings are classified as

*Loaded DRI pellets must be "trimmed," i.e., the peaks and valleys smoothed out, to guard against the "chimney effect."*

hazardous when shipped in bulk (Part 148 of Title 46 of the Code of Federal Regulations). "Shipped in bulk" are key words here. This type of material is perfectly harmless if it is in a pile in the open air. Putting it in the hold of a ship, however, is another matter.

Freight costs are a significant factor in the price of scrap that is shipped. It is sometimes difficult to find a ship to carry metal turnings because of the hazard classification and their tendency to leave an oily film. Insurance underwriters charge a higher rate for metal turnings than for other grades of scrap because of the hazard classification.

The cost of shipping is further increased by Coast Guard regulations covering metal turnings. These regulations (1) limit the maximum temperature allowed in the hold and (2) impose count-down requirements (meaning that once a safe temperature level has been reached, the vessel is required to wait in port a certain period to make sure the temperature stays down). The Coast Guard will not release a shipment of turnings until these requirements are met.

Turnings are loaded onto a ship with magnets, buckets, or "skips" (in effect, large boxes with the top and front missing). In the first two cases, material is lifted from a pile or railroad car by cranes equipped with magnets or buckets. Skips are fed directly from a dump truck and are lifted by crane and tilted into the hold.

When loading has been completed, the metal turnings are smoothed out. This process is called "trimming" and is usually done with a bulldozer. Trimming the turnings prevents shifting at sea and compacts the material, which reduces the fire hazard by decreasing the amount of oxygen in the space between the particles. It also reduces what is called the "chimney effect." If there are peaks and valleys in a pile, air sinks in the valleys. The peaks, in turn, draw the flow of air upward. This produces a draft and turns an uneven pile into something akin to a fireplace. The chimney effect would not be so serious were it not for the "hot spot" problem in metal turnings. Temperature is so uneven in a pile of turnings that a probe every ten feet or so would yield many different readings. Because turnings are poor heat transmitters, heat does not escape. Hot spots may develop and reach temperatures

*DRI pellets: a workman takes a sample as the finished product is fed to a storage pile.*

of 200 or 300°F (95 - 149°C). These are the spots where fires will start, igniting spontaneously. They are the reason why the chimney effect must be minimized.

Metal turnings' tendency to heat up can be explained in terms of their high surface-to-volume ratio—their high percentage of fine particles. Finely divided metal of all types (aluminum, zirconium, iron in fine powdered form) is used in pyrotechnics. The principal ingredient in incendiary bombs, for example, is a mixture of aluminum and ferric oxide powder known as thermite.

**Direct Reduced Iron**

Man's attempts to convert iron ore to iron and ultimately steel date back to antiquity. For over 100 years, metallurgists have attempted to accomplish this conversion directly, without having to go the blast furnace route. The resulting product has been named "direct reduced iron." All of the commercial processes presently used to make DRI remove the oxygen by getting it to react with what are called "reducing gases," namely, carbon monoxide and hydrogen. What is left after the reaction is elemental iron, also known as metallic iron. The starting material for the process is usually powder, pellets, or lump ore. The particle size of the resulting iron is approximately the same as that of the starting material, but removing the oxygen reduces the weight by about one-third. When the oxygen is removed, the substance becomes very porous (DRI was initially referred to as "sponge iron"). Although an advantage weight-wise, this property gives the substance a high surface-to-volume ratio and increases the danger of fire.

DRI has certain characteristics which appeal to steel producers. As mentioned earlier, its composition is known. (Scrap, on the other hand, is a waste product, likely to be contaminated with other materials from the machine shop and often left unprotected and thus subject to such additions as cigarette butts.) Also, only those countries with large-scale steel industries (the United States, the Soviet Union, and England) create enough scrap to export it in large quantities.

The United States and Europe are not expected to be significant exporters of DRI products. Ultimately, the sources of DRI products will most likely be the same as the present sources of iron ore. It can therefore be predicted that the importation of DRI products into the coastal waters and inland waterways of the United States will increase greatly in the coming years.

The world's present DRI production capacity is about 25 million tons per year. About one million tons are produced for export each year. Many DRI production facilities are currently under construction, and the shipping rate is expected to increase to 5 million tons per year by 1985 and 20 million tons per year by 1990.

The Subcommittee for Containers and Cargoes of the International Maritime Organization (IMO) held its 23rd Session in London in February 1982. At that session, members drafted an amendment of the entry concerning shipment of DRI found in Appendix B of the Code of Safe Practices. Fifteen countries were represented in the working group for DRI. This amendment was adopted at the 46th Session of the Organization's Maritime Safety Committee, held in March 1982.

In brief, the amended entry establishes two types of DRI for shipping purposes. In the first category is DRI in the form of lumps, pellets, and cold-molded briquettes. The second category consists of hot-molded briquettes, a densified product molded at a temperature above 1,202°F (650°C). The lumps, pellets, and cold-molded briquettes are more hazardous than the

*DRI pellets in a storage pile are covered to protect them from the elements.*

hot-molded briquettes, since the densification process for hot-molded briquettes removes most of the oxygen.

Under the terms of the amendment, shippers must certify that the material conforms to the requirements of the Code of Safe Practices. They must monitor for the presence of oxygen and hydrogen during the voyage and must do one of the following: (a) maintain an inert atmosphere containing less than 5% oxygen, (b) treat the DRI with a corrosion-resistance process, or (c) meet the conditions for waiving the inerting requirements for short or sheltered voyages.

The hot-molded briquettes are not subject to the same restrictions as lumps and pellets. A competent person, however, must certify to the ship's master that the DRI is suitable for shipment. The hot briquettes may not be loaded if their temperature rises above 150°F (65°C), and the hold must be adequately ventilated to prevent hydrogen buildup. (A concentration of as little as 4% hydrogen in air will cause an explosive mixture.)

**Spontaneous Heating**

Rusting, or oxidation, is a problem with both metal turnings and DRI. Iron in its elemental state is unstable. Oxidation is its way of returning to the state in which it is usually found in nature.* Metal fires are simply oxidation that is taking place at a fast enough rate and high enough temperature to produce flames. The following is a recapitulation of some of the factors that may affect the oxidation process and its attendant hazards:

1. The presence of contaminants such as scraps of wood, paper, oil, automobile tires, rags, and other debris. Contaminants can be a very significant factor in starting and maintaining rapid oxidation. This is particularly true of metal turnings from shops where large quantities of cutting oil are applied during machining.

2. The surface-to-volume ratio. The higher the surface-to-volume ratio, the more vigorous the oxidation reactions. Although DRI does not have the high percentage of fine particles found in metal turnings, the problems with heating up are the same. As stated earlier, the removal of oxygen from the lumps or pellets makes them very porous and results in a high surface area per unit of volume.

3. Wetting the material. This, which can be the result of natural causes or a deliberate, if misguided, dust-controlling measure, greatly increases the reaction rate. In fact, if the material is kept dry at all times, the oxidation rate is extremely slow. The IMO Code for Bulk Solids recommends that, once wetted, DRI pellets, lumps, and cold briquettes not be shipped by water.

4. A rise in temperature. A rise in temperature, always a problem in a self-heating material, will greatly increase the rate of reaction. It is a rule of thumb in the world of chemistry that the rate of a chemical reaction doubles for every 10°C (18°F) rise in the material's temperature.

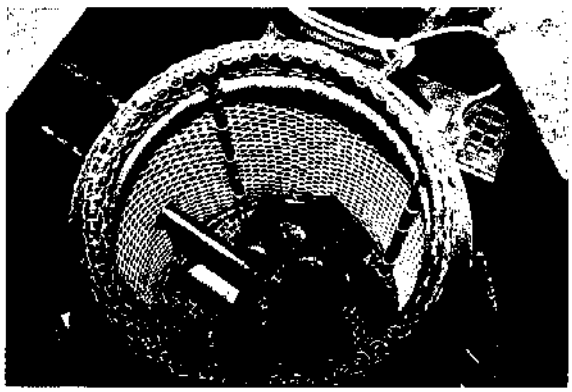
5. The ability of the material to transfer heat. DRI is as poor a heat conductor as metal turnings are. Therefore, when a hot spot develops in a material in the ship's hold, the heat cannot be transmitted to the surrounding atmosphere. It continues to slowly spread and heat up the material until combustion commences. The larger the total volume, the more likely this is to occur.

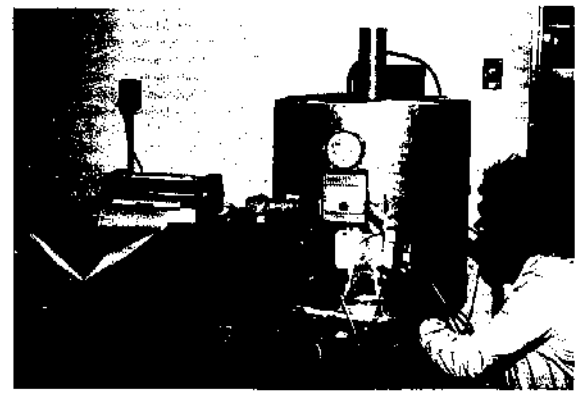
6. The "chimney effect". This phenomenon, described earlier, will promote air circulation in uneven conical piles at the top of the material in a hold and speed up oxidation.

**Tests for Stability**

There are a great number of stability tests which have been developed to determine the tendency of the various materials to oxidize rapidly. Unfortunately, all manufacturers promote their own test methods and will not agree on a universal test for all products. The Coast

* An interesting sidelight is the the case of DRI which was removed from a ship and piled onto a dock in Spain. As it oxidized, it increased its weight by one-third (the reverse process of decreasing in weight as its oxygen is removed). The additional weight resulted in the pile's causing structural damage to the dock.





*A technician uses a test apparatus to measure the reactivity, or tendency to heat up, of DRI hot-molded briquettes.*

Guard continues to work with many manufacturers to find a universal test that would be acceptable to all of them. Such a test should be conducted to identify differences in characteristics relating to the passification (corrosion-resistance treatment) process used by a manufacturer.

**Countermeasures**

There are certain actions that, if taken, can reduce the possibility of spontaneous combustion in these materials:

(1) Selecting a material that is known to be relatively stable for shipment. For metal turnings this would mean materials free of or having only small quantities of metal borings and containing no screw machine turnings or heavily rusted turnings.

(2) If possible, removing all debris before loading.

(3) Passivating the product (treating it for corrosion resistance) during manufacture or prior to shipping. One method of accomplishing this is simply to expose the material to air and allow the oxide film to passivate the particles, although this is only partly effective. A number of novel methods of passification are now under study.

(4) Purging the hold with inert gas. This will displace the oxygen, and the hydrogen will be maintained below the explosive limit. Also, the lowered oxygen concentration will slow or eliminate oxidation. Candidate gases include nitrogen and carbon dioxide. The purging procedure requires sealing the hold and continuously injecting the makeup gas. The inert gas must work its way down into voided spaces in the cargo to be effective.

(5) In loading the ship, handling the material as little as possible. Each handling exposes more reactive surface.

(6) Monitoring the shipment before and after loading. This is usually accomplished by inserting temperature probes throughout the material. If high temperature readings are received, the ship cannot move until the readings correspond to Coast Guard regulatory requirements (Part 148 of Title 46 of the Code of Federal Regulations).

(7) Inserting plastic sheets at various depths in the cargo to prevent the air from the atmosphere from penetrating the pile or circulating through the pile.

(8) Digging out hot spots from the material in the hold.

(9) Inserting cool inert gas in the pile of material. Nitrogen, for example, which becomes a gas at -340°F (-210°C), can be used to counteract the heat of hot spots.

All the above methods reduce the likelihood of fire incidents. However, once the material

actually breaks into flame there is little that can be done other than drowning it with water or unloading it at the most convenient location. If the first solution is tried, it should be remembered that wet metal is very heavy and that flooding the hold will make the ship unstable and may cause it to sink. The second solution may be impossible if permission to unload the cargo cannot be obtained. If the cargo can be unloaded, however, simply spreading the material over a large area will serve to put out the fire.

**Known Incidents**

The heating-up problem with metal turnings has been a source of concern for several years. The table below shows a list of the better-known incidents which have taken place. There have not been as many incidents with DRI, and there is thus not enough data to compile a table.

| VESSEL AND FLAG | DATE OF FIRE |
|---|---|
| M/V AGIOS GIORGIS (Greek) | March 5, 1969 |
| M/V SUAN-SAVAH (Libyan) | March 5, 1969 |
| M/V KOIKU MARU-EUROWAVE (Greek) | July 16, 1969 |
| M/V WORLD EXPLORER MEDCEMENT CARRIER (Greek) | August 8, 1969 |
| M/V KRAS (Yugoslavian) | October 12, 1970 |
| M/V PHOLEGANDROS (Greek) | November 4, 1970 |
| M/V PONTOS (Belgian) | December 9, 1970 |
| M/V PATERELIAS (Libyan) | January 6, 1971 |
| M/V REINE DES ANGES (Belgian) | February 9, 1972 |
| M/V AJAX (British) | May 31, 1972 |
| M/V NORTRANS VISION (Norwegian) | April 11, 1973 |
| M/V GEORGIAN GLORY (Greek) | May 2, 1973 |
| M/V PAULINE (Libyan) | May 31, 1973 |
| M/V MEGALOHARI II (Greek) | September 7, 1973 |
| M/V NORTRANS VISION (Norwegian) | February 29, 1974 |
| M/V GALICIA (Panamanian) | March 4, 1974 |
| M/V BRUNLA (Norwegian) | July 1978 |
| M/V ANGELIKI (Greek) | July 23, 1978 |
| M/V MIHAL L (Singapore) | August 17, 1978 |
| M/V BRUNTO (Norwegian) | August 9, 1979 |
| M/V REGAL SUN (Greek) | September 26, 1979 |

*Metal turnings from the M/V BRUNLA are removed from the hold and loaded onto the dock after catching on fire.*

**Zinc Skimmings**

So far, we have been discussing metal fires associated with iron. Nonferrous metals are also hazardous, especially in powdered form. As stated earlier, such metal powders (zirconium, aluminum, and magnesium) are used along with iron to make pyrotechnics.

One product that has even a lower percentage of metal than zinc powder has been the cause of three fires and explosions in U.S. ports. This product is known variously as zinc skimmings, ashes, dross, or residue. The most notable incident occurred on January 21, 1982. On that date an explosion and subsequent fire occurred in hold No. 3 on board the ASIA GEM. At the time of the casualty, the vessel was bound for Yokohama, Japan, after departing from Long Beach, California. The explosion—so strong that it blew the sections of the hatch cover a considerable distance—resulted in the death of a crewman who was making the No. 3 hatch cover watertight by applying a kerosene flame to the hatch seal. The crewmen tried a variety of techniques to extinguish the fire, including the expensive extreme of injecting liquid nitrogen. The fire was extinguished after three days, but officials decided nevertheless to unload the cargo back at the dock in Long Beach. The Coast Guard conducted an official investigation and offered the following conclusions:

- The primary cause of the casualty was the ignition of hydrogen gas within the hold when the crewman approached the hold with the burning torch to apply heat to the sealing tape located on the hatch cover.
- The application of sea water at the loading dock (apparently to control dust) contributed to the casualty. The water caused the release of hydrogen.
- The fact that the captain and chief mate were not aware of the hazardous potential of the zinc contributed to the casualty.

Even though the above conclusions accounted for the reaction, they left unexplained the extremely rapid rate of hydrogen release noted. The material was analyzed and found to have a zinc content of 62%. Of this 62%, 31% consisted of zinc oxide and similar compounds and 31% consisted of elemental zinc. While zinc oxide is stable, the reaction between elemental zinc and water which has become acidic (sea water, for example) is a violent one.

In another incident, two LASH barges were in the process of loading onto a mother ship when one barge exploded. The second was found to be emitting a gas measuring more than 60% hydrogen at the vent. As noted earlier, any air having a concentration of hydrogen greater than 4% can explode if ignited. The barge just described was literally a bomb, waiting to go off.

Metal turnings, direct reduced iron, and zinc skimmings ("ashes") are all entries in Appendix B to the IMO Code for Safe Practices for Solid Bulk Cargoes. The zinc ashes entry will be reviewed at the 24th Session of the Subcommittee for Containers and Cargoes in London next year. The entries for DRI and metal turnings were agreed to at the 23rd Session this year. The National Academy of Sciences will be issuing its "Report on Metal Fires" in the near future, and the Coast Guard and IMO may alter their regulations and Code on the basis of NAS' findings. As the Coast Guard gains experience with and increases its knowledge of metal fires, it will refine its own regulations for the Carriage of Solid Hazardous Materials in Bulk. ‡

The following items are examples of questions included in the Third Mate through Master examinations and the Third Assistant Engineer through Chief Engineer examinations.

DECK

1. The side lights on a vessel shall be constructed to show a light from ahead to

A. the beam.
B. aft.
C. two points forward of the beam.
D. two points aft of the beam.

REFERENCE: CG-169, Rule 21(b)

2. Having the handle of an all-purpose nozzle in the forward position will

A. produce high-velocity fog.
B. produce low-velocity fog.
C. produce a straight stream.
D. shut off the water.

REFERENCE: CG-329, Sec. 3-1-12

3. Galvanizing would not be suitable for protecting wire rope which is used for

A. shrouds.
B. cargo runners.
C. stays.
D. mooring wires.

REFERENCE: Navy Seaman's Manual

4. What is the meaning of a chart scale of 1:80,000?

A. One inch on the chart equals 80,000 inches on the surface of the earth.
B. It would always be considered a large-scale chart.
C. In the U.S., the chart would be used only as a harbor chart to give the greatest possible detail.
D. One inch on the chart equals approximately 80 miles on the surface of the earth.

REFERENCE: Duttons

5. Which is NOT defined as a finely divided organic material?

A. Charcoal
B. Peat moss
C. Aluminum powder
D. Sugar

REFERENCE: 46 CFR 146.03-12

ENGINEER

1. An electrical component is connected across a 120-volt, 60-hertz AC supply. What is the current drawn by the component if the impedance is 200 ohms?

A. .01 amperes
B. .6 amperes
C. 1.67 amperes
D. 100 amperes

REFERENCE: Basic Electricity

2. Violent gassing from a lead-acid battery while it is being charged indicates that the

A. plate separators are grounded.
B. battery compartment ventilation is inadequate.
C. electrolyte specific gravity is too low.
D. charging rate is too high.

REFERENCE: Hubert

3. When the operating handle of a molded-case circuit breaker is in mid-position, it indicates that the circuit breaker is

A. on.
B. off.
C. reset.
D. tripped.

REFERENCE: Hubert

4. Which statement is true concerning anti-friction bearings installed on pumps?

A. The inner race should be free to turn on the shaft.
B. The outer race should be free to turn in its housing.
C. Alignment is not a critical factor in their installation.
D. They are usually pressed onto their shafts.

REFERENCE: Karassick

5. When a tubular bowl centrifuge is used for purifying fuel oil, which factor determines the size of the ring dam to be used?

A. The viscosity of the fuel
B. The quantity of water to be removed from the fuel
C. The specific gravity of the fuel
D. The quantity of dirt to be removed from the fuel

REFERENCE: NAVPERS
Engineman 3 & 2

ANSWERS

1.B;2.D;3.D;4.D;5.C
ENGINEER
1.D;2.D;3.B;4.A;5.C
DECK



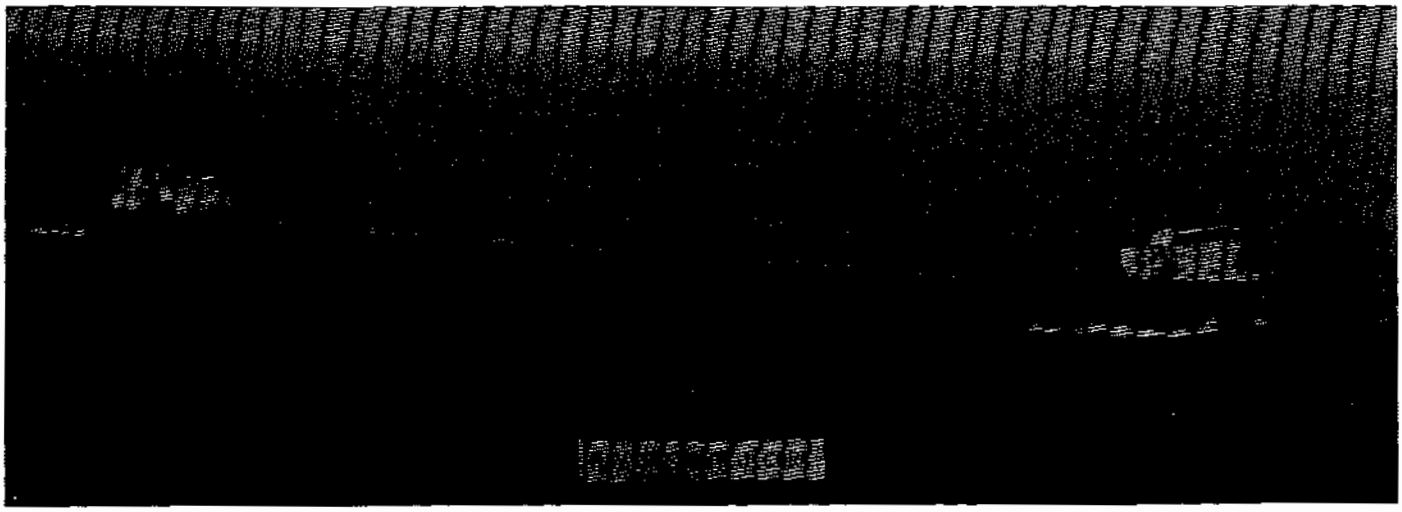

## New R&D Report Summarizes "Springing" Research

Over the past 10 years, the typical design length of Great Lakes ore carrier vessels has almost doubled. Because of the limitations of the locks through which these vessels operate, the draft and beam of the vessels (which for open waters would have been designed to be larger) have had to remain small relative to the vessel length. This trend has resulted in vessels whose length to draft ratio (L/D) is as high as 20 to 22. The highest L/D ratio covered by the "Great Lakes Load Line Regulations," a design safety guide for ships to be used on the Great Lakes, was previously established as 19. These high L/D structures have been found to be susceptible to a vertical vibration known as "springing."

Since 1972, the Coast Guard Office of Research and Development has sponsored research on the springing phenomenon on a 1,000-foot, high-L/D ore carrier, the M/V STEWART J. CORT. A series of reports has been published from this research. The latest of these reports is a summary of research done on the M/V CORT up to 1980. The main text includes a complete description of springing, pertinent characteristics of the M/V CORT, past Coast Guard springing research efforts, and the methods used to conduct this research.

This information should be of particular interest to naval architects and others involved in ship design. The results will aid in improving the construction standards for future Great Lakes ore carriers.

Copies of the report, "Springing Research of a Great Lakes Ore Carrier," can be obtained from the National Technical Information Service (NTIS), Springfield, Virginia 22161, by specifying Report No. CG-D-13-82, Accession No. AD-A115-466. Springing research done during 1981 is not included. A separate report on that subject will be published shortly. ‡



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